Trees...

A National Journal

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DIAGNOSING LEAF TROUBLES [A New Series] — *P. P. Pirone*

LIVING IN A MANHOLE — *J. F. Fonder*

March-April, 1941 **WESTERN SHADE TREE CONFERENCE NUMBER** 25 Cents

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MAINTENANCE OF SHADE AND ORNAMENTAL TREES

By Dr. P. P. Pirone

Associate Professor of Plant Pathology, Rutgers University, and Research Specialist in Diseases of Ornamental Plants, New Jersey Agricultural Experiment Station

The book, in two parts, considers the problems with which the person entrusted with the care of trees is confronted. The chapter headings in Part I are:

INTRODUCTION
I. THE NORMAL TREE
II. THE SOIL AND ITS RELATION TO TREES
III. TRANSPLANTING TREES
IV. FERTILIZERS AND THEIR USE
V. PRUNING TREES AND TREATING WOUNDS
VI. CAVITY TREATMENTS
VII. BRACING AND CABLING
VIII. TREES SUITABLE FOR STREET AND ROADSIDES

The chapter headings and some of the main subheadings in Part II are:

IX. DIAGNOSING TREE TROUBLES
X. NON-PARASITIC INJURIES
Damage Caused by Grade Changes, Slime Flux, Lightning Injury, Illuminating Gas Injury, Soot and Smoke Injury, Lichen Injury, Chemical Injuries, Mechanical Injuries, Leaf Scorch, Chlorosis
XI. INSECT CONTROL
XII. SPRAYING EQUIPMENT AND PRACTICES
XIII. TREE DISEASES AND THEIR CONTROL
XIV. GENERAL PARASITIC DISEASES
Fire Blight, Crown Gall, Powdery Mildews, Shoestring Root Rot
XV. DISEASES AND INSECT PESTS OF STREET AND ROADSIDE TREES
Ash, Elm, Hackberry, Horsechestnut, Linden, Locust, Maple, Oak, Maidenhair Tree, Plane, Poplar, Sweet Gum, Tulip Tree
XVI. DISEASES AND INSECT PESTS OF DECIDUOUS ORNAMENTAL TREES AND SOME SHRUBS
Alder, Beech, Birch, Catalpa, Flowering Cherry, Chestnut, Cotoneaster, Crabapple, Dogwood, Firethorn, Hickory, Larch, Magnolia, Mt. Ash, Red Bud, Sassafras, Serviceberry, Spirea, Tree-of-Heaven, Thorns, Walnut, Willow
XVII. DISEASES AND INSECT PESTS OF EVERGREEN TREES AND SOME SHRUBS
Arborvitae, Azalea, Boxwood, Firs, Hemlocks, Holly Juniper, Laurel, Pine, Rhododendron, Spruce, Yew

This book is not merely a comprehensive compilation of the liatest information of all phases of tree care, but includes original work and observations by the author. It will have about 300 pages of text and nearly 200 original photographs and line drawings to illustrate the various tree troubles.

About the Author

Dr. Pirone is one of the outstanding pathologists of ornamental plants in the United States. He is editor of the monthly publication "Nursery Disease Notes," which is widely used by tree men and nurserymen. He is secretary of the New Jersey Association of Nurserymen and a member of the research committee of the National Shade Tree Conference. Also he is on the advisory editorial staff of TREES magazine. He has published more than a hundred technical and popular articles and bulletins on tree and ornamental plant problems in the last three years.

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ALONG THE WAY

With . . .
EDW. SCANLON

■ A letter and pictures from HURST JOHN, Director of the GARDEN GUIDE OF MISSOURI, is very interesting and welcome. Congratulation again on the CHARMING NEW MRS. H. J., and as for the picture of the big oak—it is a whopper, but wait 'til I get the L. A. CHAMBER OF COMMERCE busy—they'll dig up a bigger one. What are the dimensions of your DOOMED GIANT?

* * *

WE HAVE A TREE in these parts of the "Newnited States" (Snuffy Smith) that I want to SHOW YOU LADS EAST OF THE GREAT RIVER. However, first I must find a photogenic one—the tree is the lovely, picturesque EUCALYPTUS ROSTRATA — it weeps so tragically.

* * *

■ *CHARLEY SINE, arborist at PRINCETON UNIVERSITY, likes TREES so well he has suggested we see the WAYS AND MEANS COMMITTEE about BINDERS FOR PRESERVING BACK ISSUES. Thanks for a swell idea—ANYONE ELSE INTERESTED?*

* * *

■ We like very much to receive copies of all the MUNICIPAL STREET TREE ORDINANCES that come within reading distance of this squib. Thanks (I hope this isn't premature).

* * *

■ *HENRY CLEPPER, Managing Editor of the JOURNAL OF FORESTRY, paid a visit to Sou. Cal. recently. FRED ROEWEKAMP, LOS ANGELES CITY FORESTER, and I took him to see an example of how compaction was overcome in a grove of native oaks (Q. agrifolia)—then kindness (surface watering to excess) overcame the grove and the result is that Phytophthora cactorum (?) and Armillaria mellea are having a holiday.*

* * *

■ If you happen to see DANA BOWERS, CALIF. LANDSCAPE ENGINEER, in a baggy pair of pants and an ill-fitting coat, don't think he can't afford KAMPUS KUT KLOTHES—it's just that he's gone DIET DIZZY.

* * *

■ And speaking of addresses—ROWLAND & NEWHOUSE, "the WEST'S FASTEST GROWING ENTREPRENEURS OF THINGS TREES," are building a swanky new JERNT at 8909 BEVERLY BLVD. in Los Angeles. It will certainly be a pleasure to visit them.

* * *

■ *Somehow or other I can't help feeling that some of YOU FELLOWS MIGHT HAVE SOME SUGGESTIONS as to subjects you would like some reading on. TREES has published a world of splendid material—this is not a pat on the Editor's back, but a TRIBUTE TO A BUNCH OF SWELL AUTHORS; however, you fellows in the field are all big enough to lick a stamp, even if it has a cannon on it (more propaganda) so drop us a line and TELL ME WHAT YOU LIKE OR DISLIKE about TREES—No fooling, and please GET IT OFF RIGHT NOW before you forget.*

* * *

Cover Picture—Courtesy of Chas. W. Colburn, Rochester, N. Y.

■ *BOB CUNNINGHAM, of Dallas, Shreveport or Ft. Worth (which is it?) is frantically scouring the Louisiana bayous for 35 to 40 ft. Magnolia grandifloras for the super DALLAS FLOWER SHOW.*

* * *

■ For the FIRST TIME IN MY EXPERIENCE I have heard of an ORNAMENTAL TREE STRUCK BY LIGHTNING IN "SUNNY" CALIFORNIA. Saw DALE GRIGGS, SUPT. OF PARKS OF SANTA ANA at the PASADENA FLOWER SHOW and he mentioned it. The tree was a *Deodar (Cedrus deodara)* outside of Fullerton. Yes, Robert, there will be pictures and data for the NATIONAL SHADE TREE CONFERENCE LIGHTNING STRUCK TREE SURVEY.

If anyone has knowledge of such a phenomena, let me know—please.

* * *

■ *Had my annual visit with O. V. MATTHEWS, the peerless Oregon wood collector and photographer, the other day. Nice Oregon weather we had for him—rain!*

* * *

■ Another book has been added to TREES' library. JIM DRAPER, of the CALIFORNIA SPRAY-CHEMICAL CORP., dropped in the other day and presented a copy of JULIA ELLEN ROGERS' "Trees." THANKS, JIM—the book is the smallest part of the gift.

* * *

■ *Some dandy pictures of a huge American Elm popped out of a letter from ED BLACKFORD (Wisconsin Tree Expert Co., Wausau) the other day. He moved the tree, a 26-incher, for the Employers Mutual Insurance Companies.*

* * *

MRS. BILL JONSON, brains of the DESTRUXOL SPRAY CORP. (you know me Bill, always clowning—no offense, Mrs. Bill) on a garden radio program some Sundays ago. Very nice, to-the-point talk—voice SOUNDS LIKE A HOLLYWOOD GLAMMER-GAL.

* * *

■ *It was an inspiration to see MR. HENRY O'MELVENY, one of California's MOST ARDENT AND ACTIVE PATRONS OF HORTICULTURE, taking in the flower show. HE IS HALE AND HEARTY AND GENIAL AS ALWAYS.*

* * *

■ *CHARLES FREY, proprietor of the NEW ENGLAND FORESTRY SERVICE, INC., has moved to A NEW SPOKE of the Boston wheel—20 Kilby St.*

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■ While the East shivers and shakes from snow and ice, California is now witnessing the gorgeous spectacle of the Camphor tree changing its dress. The light Kelly green leaves are taking on vivid carmine hues. Seeing some the other day I was reminded so much of the Sassafras of the Eastern fall in its droopy disrobement.

* * *

■ *PIERRE MILLER, plant pathologist at the UNIVERSITY OF CALIFORNIA AT LOS ANGELES, would like to have a report from all Arborists and Park Superintendents regarding Oaks (Q. agrifolia) that show signs of the bleeding canker. This disease is indicated by black bleeding spots on trunk or limbs. DR. FRANK L. HOWARD, RHODE ISLAND STATE COLLEGE, has isolated Phytophthora cactorum as the mischief-maker and Pierre, who is working with Dr. Howard on the California end, would like more patients than he now has to work on. GEORGE FREEMAN, the SANTA BARBARA ARBORIST, discovered the disease recently in Pasadena in connection with some severe cases of Armillaria mellea, not, however, on the same trees.*

* * *

■ I note in PHIL ALDEN'S "SHADE TREE" that the NEW JERSEY CERTIFIED TREE EXPERT BOARD is about ready to start examinations.

PARK SUPERINTENDENTS can help this setup in Tree Preservation by OPENLY RECOMMENDING only C.T.E.'s TO PEOPLE CALLING THEIR OFFICES for advice on whom to secure for tree service.

* * *

■ *It is a pleasure to learn that the SAN MATEO COUNTY RECREATION COMMISSION have recognized the value of their trees and have retained LESLIE MAYNE as CONSULTING FORESTER. Leslie is a graduate in FORESTRY from CAMBRIDGE UNIVERSITY, ENGLAND. Before coming to GOD'S COUNTRY he served in the FOREST SERVICE OF THE SARAWAK GOVERNMENT. He is now an arborist in San Mateo and a staunch WESTERN SHADE TREE CONFERENCE MEMBER.*

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March-April, 1941 BI-MONTHLY Volume 4 — No. 2

EDWARD H. SCANLON, Editor
Editorial Office: 114 Santa Monica Boulevard, Santa Monica, California

"No place is complete without trees. A home without trees is charmless; a road without trees is shadeless; a park without trees is purposeless; *a country without trees is hopeless*"

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CORDIALLY YOURS

DR. PIRONE ON STAFF

TREES is happy that its efforts and policy have been endorsed by the recent acceptance of its invitation to Dr. P. P. Pirone to serve on the Advisory Editorial Staff.

For the past four years Dr. Pirone has been on the staff at the New Jersey Agricultural Experiment Station and in that time he has shown a very genuine love and interest in the cause of shade trees. His work is known by tree men throughout the nation and is a bit too voluminous to even skip over lightly here, but suffice it to say the field of shade tree husbandry has an able, well-trained investigator deeply devoted to its problems. The years hold much promise for "Pat."

JUST PLAIN BLUE AND BROWN

—but this season the caterers to milady's fashions call blue and brown by the intriguing names of "Blue jean" and "Timber."

Therein lies a tale that might well be applied to the components of the field of Tree Preservation. They very seriously lack any indication of the merchandising sense that by a mere play on words will undoubtedly have all of the better dressed ladies cavorting this spring in "Blue jean" and "Timber."

For too many years Arborists have been selling the same old services—cavity filling, pruning, feeding—the same old bug-a-boos. Of course, we do not mean to imply that these services should be discontinued—not at all, but why not seek new services or new methods for old ones? A careful study of the art of diagnosis should bring new services, materials, methods and items to the fore. The public is ever awake to something new, as is evidenced by the above title, and it would seem that now is as good a time as ever for Arborists to get out of the rut, discard prejudices, experiment with new devices and methods and go places. There certainly should be a "Blue jean" and "Timber" combination somewhere in tree preservation!

THERAPEUTICS RESEARCH

Again we should like to urge, strongly, that the readers of TREES lend their efforts toward the establishment of a research unit on Tree Therapeutics by the Division of Forest Pathology, Bureau of Plant Industry.

Mr. Edgar G. Rex, chairman of the National Shade Tree Conference committee on the subject, recently appeared before the House of Representatives sub-committee on appropriations to explain the nature and possibilities of the study.

We do not know what this program may bring to light, if anything; however, it very definitely is progress. We are for it and sincerely ask that you write your Congressmen and Senators in Washington to support this appropriation.

New Poison Oak Preventative

Protection against poison oak or ivy is possible by use of an alkaline vanishing cream containing *sodium perborate or potassium periodate,* according to a report issued by the United States Public Health Service. This protective ointment for the prevention of ivy and poison oak poisoning consists of 10 per cent sodium perborate in a vanishing cream which is to be rubbed into the skin of the arms and face before exposure. The vanishing cream fills the pores and forms a protective covering, preventing much of the poison from penetrating the skin.

As the perspiration comes in contact with the vanishing cream in the pores of the skin, a soap is formed and the alkalinity of the soap tends to neutralize the poison ivy, in addition to washing it off and out of the skin. This ointment was developed in the Office of Dermatoses Investigations at the National Institute of Health, Bethesda, Maryland.

This vanishing cream should be freshly prepared at least once in two weeks to avoid deterioration. The cream used in the experiments was slightly discolored but still active after one month.

In the case of persons working where they might come in contact with poison oak or ivy, the protective cream should be applied in the morning and allowed to remain on until the noon hour, when it should be removed by washing with soap and water; this will emulsify the vanishing cream in the pores of the skin and wash away whatever poison may be in the pores or on the skin. The cream should be reapplied again after the lunch hour and again washed off in the evening when work is over.

STREET TREE ORDER

According to Charley Williams of the Williams & Harvey Nurseries Co., his company has received a fine order for street trees from the Kansas City Park Board. It consists of 1,000 American and Moline Elm, 124 shrubs and 50 other trees. Williams & Harvey are also the manufacturers of widely used and endorsed tree moving equipment.

LEONARD CATALOG

The 1941 catalog of the A. M. Leonard & Son Co., of Piqua, Ohio, is a handy booklet size, very convenient to keep on hand. Practically any tool or piece of equipment for the Arborist, Nurseryman or Park Department is available. Copies will be sent on request.

CHLORIDE DAMAGE TO TREES

The somewhat extensive use of calcium chloride for the laying of dust on dirt roads is dangerous to roadside trees. Injury from chloride has been particularly marked the present season because the unusual amount of rain has resulted in greater leaching and more of the chloride has been carried to the roots of trees, especially those along the roadside. Damage of this nature can be obviated to some extent by grading roadsides in such a way as to prevent flood waters seeping about the roots of valuable trees.

Another noteworthy chloride or salt injury to roadside trees has been apparent this season. This results from sand treated with chloride for winter use being piled near trees or groups of trees. Presumably these afford a ready means of locating the sand. The piles are, however, disastrous to trees and in midsummer many of the treated sand piles could be located easily by the badly burned or discolored foliage likely to be followed by the death of the trees. The solution obviously is storing treated sand where there are a few or no desirable roadside trees.—*Scientific Tree Topics.*

How to Use on Ornamental Trees and Shrubs

TRANSPLANTONE is especially suited to ornamental evergreens because it increases root development. Outstanding in response to TRANSPLANTONE are azalea, juniper, rhododendron, pine, hemlock, pyracantha and holly, although the deciduous trees like elm, oak, maple and fruit trees (bare-rooted or with ball and burlap) also show good responses in root growth. For use, dissolve a level teaspoonful of TRANSPLANTONE in a gallon of water, or an ounce in ten gallons of water. Soak the soil around the roots with this solution, sinking holes with a crowbar under the ends of the outer branches to get the solution down to the root ends. When planting a tree with a ball of earth around the roots, it may be desirable to line the hole with a layer of peat moss, so the solution when applied, will not drain off too fast. The amount of solution will vary from two gallons for a 12 inch ball of earth to 50 gallons for a 10 foot ball. Use at least one gallon for each inch of trunk diameter. Hemlocks are difficult to transplant, however TRANSPLANTONE has reduced mortality in hemlock plantings from 90 per cent to 15 per cent under very severe conditions. Dormant roses soaked in TRANSPLANTONE for one hour before planting show much response in root formation, general vigor and growth. Flowering crabs, cherries, pfitzer and Virginia juniper, red spruce and American elm trees have shown increase in root growth of 40 to 60 per cent as a result of TRANSPLANTONE treatment according to Ohio State Experiment Station.—*Ortho Plant Protection News.*

Arboreta Curators Form Society

Dr. Donald Wyman, of the Arnold Arboretum, recently elected General Chairman for the newly formed American Association of Botanical Gardens and Arboretums, has sent us a copy of his first efforts toward coordinating this important field of American Horticulture.

TREES is strongly in favor of the policies of this new organization and is a staunch supporter for the establishment of new arboreta, particularly, throughout the country. For years we have worked for an Arboretum in Southern California. We hope to be able to cooperate with Dr. Wyman in his future plans and offer him space whenever he so desires. The suggested five-year plan for the Association follows:

I—*Membership Committee*

This committee consists of Clarence E. Godshalk, Morton Arboretum, Chairman; Robert Pyle, West Grove, Pennsylvania, and Harold A. Senn, Ottawa, Canada. It is actively engaged in notifying all those connected with botanical gardens or arboretums of our organization and of our objectives, urging them to join in our work.

II—*Publication Committee*

This committe consists of L. C. Chadwick, Ohio State University; Ruth V. Schmidt, Whitnall Arboretum; Henry T. Skinner, Morris Arboretum; and John C. Wister, Arthur Hoyt Scott Foundation; with Henry T. Skin-

(*Continued on page* 12)

Conference Visits Bean Plant

A visit to the plant of the BEAN-CUTLER Division of Food Machinery Corporation has been scheduled as one of the features for the Western Shade Tree Conference to be held in San Jose in May. By conference time a new $50,000 factory will be completed. The Bean-Cutler plant in San Jose has been expanded and rebuilt and is one of the most modern plants of its kind on the coast. Constructed entirely of steel and reinforced concrete, it incorporates the latest ideas in factory layout and equipment.

One outstanding feature is engineered lighting with fluorescent illumination throughout, bringing maximum light to bear on the various operations. Also, new electric cranes have been installed to handle the heaviest of machines easily and quickly.

New machine shop and welding facilities have been built in line with the trend to all-steel sprayer construction as pioneered by Bean with the introduction of their Royal Sprayer in 1934.

The new factory may be said to be streamlined in layout, equipment being placed so as to keep the various factory processes operating at highest efficiency and keep down manufacturing cost to the minimum; in spite of added material costs which have come as a result of defense activities.

Trees...

DIAGNOSIS OF TREE DISORDERS (A New Series)

No. 1 — Diagnosing Leaf Troubles — Aerial

By P. P. Pirone

Assoc. Prof. of Plant Pathology, Rutgers University, and Research Specialist in Diseases of Ornamental Plants, N. J. Agricultural Experiment Station

Successful treatment of any abnormality of trees, as of human beings, depends primarily on correct diagnosis. Some troubles occur so frequently on certain trees and have such specific symptoms that they are readily diagnosed by the competent tree man; others are so complex that even the most expert arborist cannot fathom them. A reliable arborist will not hesitate to admit his inability to diagnose some leaf abnormalities and will not hesitate to recruit the aid of a specialist to help in the diagnosis, such as medical doctors often consult specialists in difficult cases. The arborist and home owner must remember, however, that some leaf troubles cannot be fathomed even by the so-called specialists.

The ability to diagnose the more complex leaf troubles is acquired only through years of close association with a large number of cases. Any attempt to describe how to diagnose most leaf abnormalities would, therefore, fall far short of the objective. Nevertheless, a discussion of the more common symptoms will aid many tree men in diagnosing the less complex leaf troubles.

PROCEDURE AT DIAGNOSING

Before examining any part of an ailing tree it is well to glance at the general surroundings. Are other nearby trees healthy? Is the tree under examination of the type suitable for the particular atmospheric and soil conditions? Have any special treatments been given prior to the appearance of the abnormal condition? After these and related questions have been answered one would then proceed with the direct examination of the leaves.

The leaves constitute the best starting point because they are most accessible and are first to show outwardly the effects of any abnormal condition. There are two important points to bear in mind. First, the arborist must have a complete understanding of a *normal* leaf, because the size and color of normal leaves vary greatly among the different tree species and even among trees of the same species. Second, the arborist must appreciate the fact that abnormalities in leaves may be the result of injuries, diseases, etc., in the branches, the trunk or the root system. It has been my observation that at least half of the leaf abnormalities are associated with some type of injury to the roots or some unfavorable condition in the soil. The present article does not include a detailed discussion of leaf troubles that result from root injuries or diseases, from a lack or an excess of nutrients, or from moisture deficiencies and excesses, etc., but deals primarily with factors present in the above-ground parts of the tree. These will include insect injuries, parasitic fungi and bacteria, atmospheric conditions, and toxic substances in the atmosphere.

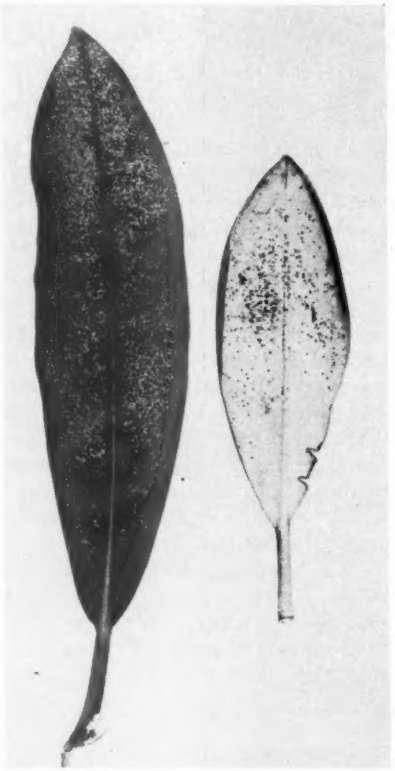
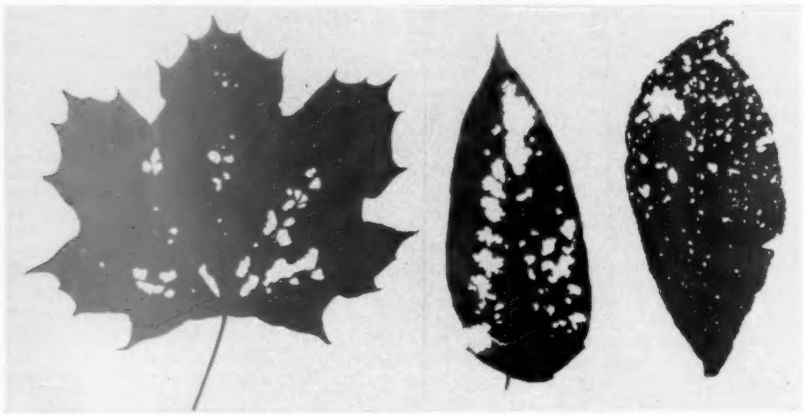


FIG. 2. Lace Bug Injury on Rhododendron. Note the stippling of upper surface resulting from sucking of juices on the lower surface. Right, lower leaf surface showing black specks of excrement.



—Photos courtesy of the Author

FIG. 1. At first glance, most tree men would say that the holes in the maple, ailanthus and hickory leaves shown above were produced by chewing insects. Actually, insects were not involved. See text.

INSECT INJURIES

Insect injuries are rather easily diagnosed, either by the presence of the pest or by the effect of its feeding. The leaves may be partly or completely chewed, or they may be yellowed as a result of sucking of the leaf sap, blotched from feeding between the leaf surfaces, or deformed from feeding and irritation. Injuries by many insects is often quite specific. The Japanese beetle, for example, eats the leaf tissues from between the small veins leaving a striking, lacelike pattern. The larvae of the elm leaf beetle feed on the lower leaf surface leaving most of the upper surface untouched, whereas the adult beetles feed on the upper surface leaving somewhat rectangular holes about one-fourth inch long.

A little understood trouble on many deciduous trees in the eastern United States has all the ear-marks of injury by chewing insects, but to date no insects have been found associated with it. (Fig. 1). More or less regular holes appear in elm, plane, maple, Ailanthus, magnolia and ash rather early in the season before any known chewing insects are about. These holes enlarge as the leaf increases, and to all outward signs, appear to be the result of insect feeding. My preliminary observations indicate that this trouble is associated with the absorption of greater amounts of water into the leaves than can be transpired. Areas in the leaves thus become watersoaked. Eventually the watersoaked areas dry up and the affected tissue drops out leaving holes resembling those made by insects.

Injury by spider mites shows on the upper leaf surface as a fine, rather uniform, graying stippling, even though the mites are usually present and feed only on the lower surface. Injury by leafhoppers resembles that produced by spider mites but the stippling is somewhat larger and coarser. Lace bugs feed on the lower leaf surface primarily. Here, black spots of excrement as well as the characteristic spiny larvae and adults with lacelike wings, are visible. The upper surface, however, is heavily mottled (Fig. 2) as a result of the feeding on the lower surface. Thrips feed on both leaf surfaces by rupturing the outer cells and sucking the juices. The injured areas assume a whitish, glistening appearance. A hand lens is needed to distinguish feeding by thrips from that by leafhoppers and lace bugs. Close examination reveals ruptured leaf cells where the former are involved. Galls or swellings on leaves usually result from feeding and irritation by any one of a number of different insect species.

It is well to remember that the services of the experiment station, federal and state entomologists are always available for the identification of insects and insect injuries.

INJURIES BY PARASITIC FUNGI

Leaf injuries produced by parasitic fungi are not diagnosed so readily as insect injuries, however, because the causal organisms are usually not visible to the naked eye. In some instances, tiny, black, pinpoint fungus bodies in the dead areas, visible without a hand lens, are indicative of the causal nature (Fig. 3B). Lesions resulting from fungus attack are more or less regular in outline with varying shades of color along the outer edge. They may be distinctly marked as in the case of the so-called frog-eye spot of maple (Fig. 3A) or may appear as brown blotches with yellow margins, as in the leaf blotch disease of horse chestnut (Fig. 4A). The spots, of course, always start as pin-point dots and then increase in size, their rate of increase depending on the fungus and host plant involved, and on the atmospheric conditions.

Some parasitic fungi, as for example the powdery mildews, do not produce definite spotting of the leaves. These can be readily diagnosed by the appearance of the delicate, cobweb-like graying white fungus growth over the leaf surfaces (Fig. 4B). Most of our deciduous tree leaves are subject to mildews, especially late in the growing season.

The group of fungi belonging to the genus Taphina produce blisters and curling of the leaves. Circular, raised areas ranging up to a half inch in diameter are scattered over the upper surface, causing a depression of the same size on the lower surface (Fig. 4D). The upper surface of the bulge is yellowish white, and the lower, yellowish brown. The leaves remain attached to the tree and there is rarely any noticeable impairment in their functions. Oaks and maples are particularly subject to the leaf blister fungi.

Atmospheric conditions preceding the appearance of spots on leaves can often be used to advantage in determining the cause of injury. For example, when leaf spots appear after a week or ten days of continuous rainy or cloudy weather, one can safely assume that a parasitic organism is responsible, because such conditions are favorable for its spread. Under ideal conditions for fungus spread, a number of spots may enlarge and coalesce and result in complete blighting of the leaves; or, the organisms may be of the type that attack the leaf veins and petioles

(*Continued on page* 11)

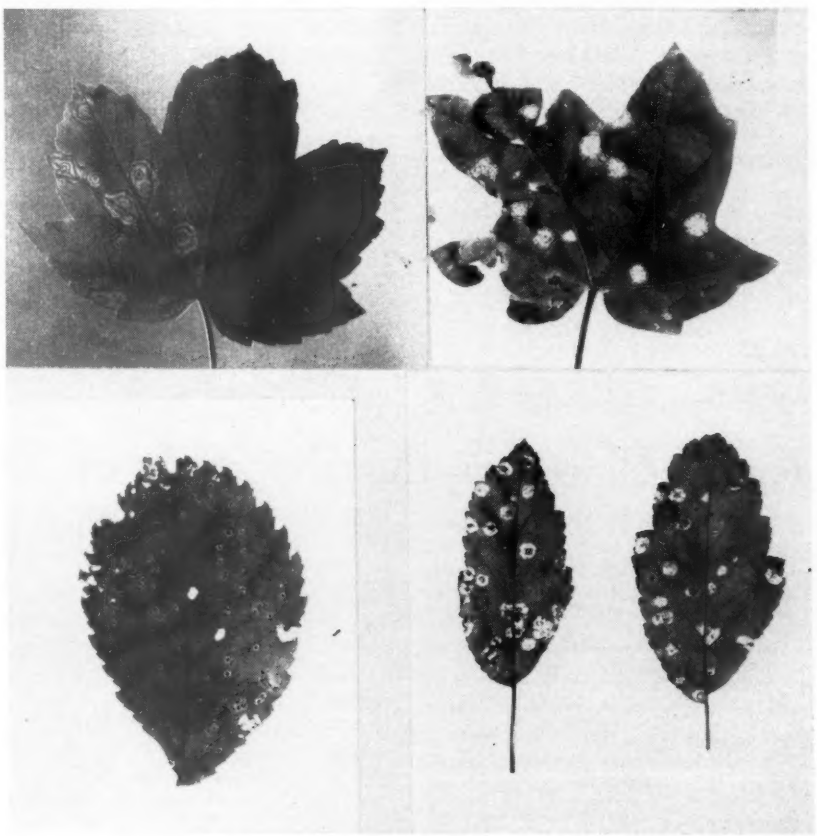


FIG. 3. Fungus Leaf Spots Have Certain Characteristic Symptoms. (A) Frog-eye spot of maple. Note the target-board appearance of the individual spots. (B) Phyllosticta leaf spot of maple. Note the black, pin-point dots within the spots. These are fruiting bodies of the causal fungus. (C) Tar spot of elm. The spots are black, raised and sharply defined. (D) Rust spots on flowering crabapple. These are orange yellow, raised blisters.

Southern Shade Tree Conference

Three strikes and out is true in baseball but not so with the Southern Shade Tree Conference. The fourth meeting of this juvenile organization closed Saturday noon, February 22, after a most successful three day meeting at the University of Florida at Gainesville. Without doubt the meeting exceeded all previous Southern Conferences with respect to attendance, quality of the program and general interest. The registration was about 150 and those in attendance came from all sections of the eastern half of the United States. The membership of the National Shade Tree Conference was well represented, 27 members being present. Doctor L. C. Chadwick, secretary-treasurer of the National Shade Tree Conference, and Dr. Paul E. Tilford, editor, represented the National organization. The membership of the National Arborists Association was also well represented. Vance Shield and Wesley Hollister—president and secretary-treasurer—represented the N. A. A.

Twenty interesting and informative papers made up the program. These are to be published in a printed proceedings along with the papers given at the three previous meetings, and will be available in a few weeks. One-half day was given to a demonstration of tree moving. A large dogwood, a sycamore and two live oak trees were successfully moved. The two evenings were taken up with business meetings, inspection of trade exhibits and general discussion. The discussion Saturday morning was an exciting climax to a very interesting program. Questions had been placed in the question box by those in attendance and when the conference was closed on schedule Saturday noon, twenty-four questions still remained in the box. Bob Weakley says that a record will be kept of these questions and that they will be presented at the Fifth Southern Shade Tree Conference in Miami next winter.

President R. M. Weakley of Warren, Pennsylvania and West Palm Beach, Florida, was reelected president of the Southern Shade Tree Conference and A. Robert Thompson of the National Park Service, Washington, D. C., was elected vice-president. Professor H. S. Newins, director of the University of Florida's School of Forestry, was reelected secretary-treasurer. The Conference next year is to be held in February at Miami, Fla.

The following history-making events deserve special mention: the finesse with which "Lime" Howe ducked the "Bug on the Judas Tree" and the extraordinary ability displayed by Messrs. Warner, Lowden and Van Wormer in handling the ladies' program.

Outstanding events at Palm Beach were: the trained lobster that put on an act for Vance Shield during the dinner at one of Palm Beach's famous seafood restaurants; announcement of "Pinky" Thompson's birthday and the Happy Birthday song in his honor by the orchestra at the "juke joint" came as a complete surprise to Bob. And was he pink! Ask Billy Shield! Oscar Warner was caught taking moving pictures of a signpost—which should indicate something or other; Professor Chadwick and his discussion with the owner of the orange grove; "Lime" Howe's exhibits that come in convenient little bottles; Oscar Warner pulled a fast one and was seasick immediately after breakfast in order that it would not interfere with his fishing; the affair between "Pinky" Thompson and Gladys shocked the rest of the boys; Walter Ritchie's statement that he is going back to college; the mysterious disappearance of Van Wormer!

Shield and Oscar Warner plan to start a tree business in the south and name it the Bogus Tree Company, just as soon as they can find out about the tolerance of palm trees to spray oil injury. They were noticed in a huddle with B. G. Pratt, who gave these young fellows some hot tips. Jerry Baker proved so proficient at the art of "juking" (a new term for an old custom in Florida) with the help of Betty Donze, Bob's pretty secretary, that he intends to open a "Juke Joint" in Charleston as a side line to the tree business.

Fish or no fish, Bob Weakley and family are excellent hosts. More power to him and the Southern Shade Tree Conference—everyone had a grand time!

An Outline For the Diagnosis of Shade Tree Troubles

By D. S. Welch
Cornell University

Editor's Note: *This splendid outline appeared in a recent issue of Arborists News. We are pleased to reproduce it.*

Any person who makes it his business to study trees has no doubt developed a more or less satisfactory system of his own for observing them. Few have attempted to set down suggestions which might be useful to others engaged in similar work. In the course of several years' work with students of tree and shrub diseases, the author has developed the following outline for the diagnosis of troubles of trees and shrubs. It is presented here with no claim as to its merits other than that it has been useful. Suggestions as to its improvement would be welcome.

It is designed for use as a guide in making an examination of diseased trees and shrubs. Every item covered has some significance and may be of considerable importance in the final analysis. In dealing with many of the points considered, it is obvious that a familiarity with the normal or healthy plant is essential.

It is not to be expected that complete and satisfactory observations can be made in all of the indicated subjects. An attempt should be made to cover as much of the outline as possible. The more complete the evidence obtained, the more reliable will be the conclusions which may be drawn.

The chief value to be found in the outline is that it insures a fairly complete set of observations, thus eliminating the possibility of serious omissions.

I. Kind of plant (determine both common and scientific names).
II. Age or size. If a tree, note circumference in inches at about 4½ feet from ground.
III. Condition.
  A. Foliage.
    1. Note any unusual appearance in color, size, number or density of leaves, if any.
    2. Observe insect damage.
    3. Look for symptoms of wilting, yellowing, defoliation, spot or blight, etc. Collect specimens if possible.

(*Continued on page* 16)

Western Shade Tree Meet In May

The combination of heavy rains and warm weather that has prevailed generally this winter in California should provide for a beautiful arboreal display when the Eighth Western Shade Tree Conference convenes in San Jose, May 15-16-17.

Ray D. Hartman
President
Western Shade Tree Conference
Pres. & Mgr., Leonard Coates Nurseries
San Jose, Calif.

Hawthornes, Paulownia, Locusts and many other fine trees that adorn this fine little city will be at the peak of their glory at that time and should make for a grand tour of the city, part of the itinerary. The program contains a number of fine papers, the outstanding of which in importance is probably the two by Dr. Frank Howard and Pierre Miller on the discussion of the bleeding canker disease. This disease has been quite serious for years in the East affecting Beech and hard Maple. But last Spring Dr. Howard, on a visit to California, discovered it on the coast live oak (*Q. agrifolia*). Mr. Miller has been doing the investigational work in California and will discuss the situation as he has found it. Other papers and the two clinics—shade tree problems and diagnosis—round out a rich program.

The Local Arrangements Committee is headed by Michael Antonacci, Planning Engineer, City Hall, San Jose. The other members are Dr. H. E. Burke, L. C. Maynard, Ed Meyers and Ken Wilson.

Headquarters for the Conference will be in the Sainte Claire Hotel, with the registration and assembly being held in the Municipal Auditorium, directly across the street through one of San Jose's fine parks.

TENTATIVE PROGRAM

May 15, 16, 17, 1941

THURSDAY, MAY 15

Morning

9:00 Registration of Members and Visitors, San Jose Municipal Auditorium
Chairman, Ray D. Hartman, President
10:00 Address of Welcome
Clarence B. Goodwin, City Manager, City of San Jose
10:20 Response
Ray D. Hartman, Pres. of Conference
10:30 "The Development of a Street Tree Planting Plan and Ordinance for the City of San Jose."
Speaker: Dr. P. Victor Peterson, Pres. of the City Planning Commission, City of San Jose
Appointment of Committees:
Nominating
Resolutions
Diagnosis Clinic
W. S. Rowland
Willis Wagener
Dr. E. O. Essig
Edward H. Scanlon
Announcements

Afternoon

12:15 Luncheon, Sainte Clare Hotel
Chairman, F. W. Roewekamp, Landscape Engineer, Los Angeles Park Department
1:30 "Horticulture of New Zealand and Dutch East Indies." Color Films.
Speaker: Keith L. Davey, General Manager, Davey Tree Surgery Co.
2:30-3 Discussion
3:00 "Specimen Trees"
Speaker: Albert Wilson, Garden Consultant, Palo Alto, Calif.
4:00 "Trees and Traffic"
Speaker: Leslie Mayne, Arboriculturist, San Mateo, Calif.
7:30 Committee Sessions
San Mateo County and Peninsula—Speaking Motion Pictures

FRIDAY, MAY 16

San Jose Municipal Auditorium

Morning

9:30 Speakers:
E. O. Essig
Dr. Frank L. Howard, Rhode Island State College: "A General Discussion of the Bleeding Canker Disease"
Pierre Miller, University of California at Los Angeles: "A Discussion of the Bleeding Canker in California"
Ralph H. Smith, Prof. of Entomology, Univ. of California, Los Angeles: "Recent Studies on the Control of Sycamore Scale."

Afternoon

12:15 Luncheon, Sainte Claire Hotel
1:30-1:45 San Jose Municipal Auditorium
Review of Tour and Demonstration
1:45-2:30 Exhibitors
Ken Wilson, Chairman
2:30 Demonstration and tour. Visit to Bean Manufacturing Company
Howard Shannon, Chairman
7:00 Banquet, Sainte Claire Hotel
Election of Officers

SATURDAY, MAY 17

Morning

9:30 Clinic. Chairman, Ray D. Hartman, President of Conference
Panel to consist of the following:
Dr. H. E. Burke, Entomology
Leroy Abrams and Woodbridge Metcalf: Varieties of Trees
Frank L. Nolan, Tree Problems
L. R. Cody and Lloyd Maynard: General
Ray D. Hartman, Production

Progress In Street Tree Survey

With the acceptance of the Chairmanship for Section Seven of the National Street Tree Survey by Edgar M. Sanborn, Park Forester, Oakland, California, Park Department, there remains only one section, number eleven, Oregon and Washington, to get under way.

Chairman, Section 8
Fred M. Guirey
Landscape Architect Arizona Highway Dept., Phoenix

Mr. Fred M. Guirey has kindly accepted the Chairmanship of Section Eight which embraces the States of New Mexico and Arizona. Mr. Guirey is Landscape Architect for the Arizona Highway Department, and has his section well under way with Mr. Harvey H. Cornell, Regional Landscape Architect of the National Park Service, serving as Vice-Chairman for the State of New Mexico.

The Survey as a whole has been highly successful and although many charts still remain unreturned, it is hoped they will all be in by mid-summer so that the final work of compiling can be started and the master charts published.

Since our last issue the following have sent in their charts. We are very grateful:

Phil Chambers, City Forester, Sandusky, O; Paul L. Sandahl, Executive Supt. of Parks, Des Moines, Iowa; T. E. McSherry, Arborist, Fryeburg, Maine; Carl B. Arentson, Forest Supervisor, Kemmerer, Wyo; C. C. Clemens, Park Supt., Casper, Wyo; Ted Risberg, Whitefish Bay Forester, Milwaukee, Wis; R. R. Rothacker, Iowa State College, Ames; Alfred T. Neilsen, Arborist, Council Bluffs, Ia; Russell O. Koenig, Supt. of Parks, Saginaw, Mich; Lowell Kammerer, Morton Arboretum, Lisle, Ill; C. R. Faust, Supt. of Parks, Winston-Salem, N. C; William W. Wells, Landscape Architect, State Parks Div., Mandeville, La; Louis S. Cole, Engineer-Secy., Glenview Park District, Ill; Wm. R. Yerkes, Board of Park Com., Wichita, Kans; Louis F. Maraist, Jr., Longfellow Evangeline State Park, St. Martinville, La; W. A. Simmons, Secy., State Hort. Soc., Sioux Falls, S. D; Glenn Garwood, Supt. of Parks, So. Pasadena, Calif.

Trees...

"Living In a Manhole"

By J. F. FONDER
Permalawn Products Co.
Evanston, Ill.

Just by way of a title and because it is illustrative, although a little extreme, of the conditions trees are sometimes forced into! This simile is occasioned by the unfortunate lot of a stately, 15-inch Elm tree in front of a fine, new Federal Post Office in a midwestern city where myriads of splendid trees are spoken of as one of the city's greatest assets. When the aforesaid post office was erected it was found possible, in spite of the protest of the Park Superintendent, to allow this tree an unpaved area only five feet square. The balance of the surrounding surface was considered more important for the wide side walk leading to the impressive steps. There the tree stands, growing out of a hole in the side walk too small to support a sapling.

Yes, this is an extreme example, but there is no denying that urban trees are forced to live under artificial conditions that too often are very unfavorable to them. Sometimes the atmosphere is charged with poisonous gases that soon prove fatal to all but the most tolerant species. Frequently the air is so smoke-laden that an unsightly, dirty film is deposited on the leaves during their entire life, seriously interfering with proper metabolism. But it is a general rule for urban trees to live under much more unfavorable conditions as far as their food supply is concerned. The universality of this regretable condition is well stated in Missouri Botanical Garden Bulletin No. 1936, in a discussion of the possibility of diagnosing the need for feeding shade trees, as follows: "While a careful diagnosis is particularly important, shade trees generally are so dangerously underfed that it is better to feed first and diagnose later."

We usually think first of the unsightly appearance made by under-nourished trees. But as unattractive as are their small, under-developed, light colored or chlorotic leaves the appearance of the tree is insignificant compared to the handicap imposed upon it in its battle for existence. This also is so well worded in Missouri Botanical Garden Bulletin No. 4 that I quote again: "It is well known that the under-nourished tree most generally falls prey to the ever present enemies. The declining tree cannot resist borer attacks, nor can it withstand dry weather; nor can it sacrifice any more of its few yellow leaves during a caterpillar invasion. A well-fed tree will require much less water than its starving neighbors. To the tree owner in the Middle-West, this last feature, always associated with feeding, is worth the expense involved and cannot be over-emphasized."

To these handicaps we may now add that under-nourished trees are the ones which will succumb first to killing winter weather. As is so often necessary, our information comes from work done on fruit trees, in this case peach trees in North Carolina. In North Carolina Bulletin No. 322, it is stated that "The only occurrence of winter injury was with trees in extremely low nutritive condition and none occurred with late fertilization." It has been pointed out on numerous occasions in the past that the tips of twigs of well nourished trees contained more nutrient materials than did the twigs of unfed trees and were therefore more resistant to low temperatures. We can observe this effect of high nutrition at will by noting how much longer well fed trees retain their leaves in the fall than do under-nourished trees.

Numerous of our ideas concerning tree feeding have had to be altered drastically during the past few years and we can only guess at what may come in the future as more and more attention is given to this very important problem. It was not so many years ago that we were told that trees would respond only to one element—nitrogen. It was granted that the failure of other elements, such as phosphorus and potash, to produce response might have been due to the method of application, nitrogen being the only element that could move deeply enough into the soil to reach the principal root zones. Several pioneers in shade tree feeding demonstrated early that surface applications were not efficient in the feeding of any but small trees and that phosphorus and potash were important in tree feeding if placed in the soil in the zones occupied by the feeder roots.

In this connection, within the past year Chadwick (Bimonthly Bulletin, Ohio Agri. Exp. Sta. No. 204) has stated that: "It is very probable that the chief reason why responses of trees to phosphoric fertilizers have not been striking is the failure of the roots to come into contact with the phosphorus applied. It has already been mentioned that the penetration (of phosphorus) is very slow and its movement radially in the soil is almost nil. It would seem from the results reported that the formula should contain at least nitrogen and phosphorus, this being supported by the poor response of the trees to ammonium sulfate alone and by the increased amount of fibrous roots produced when ample quantities of phosphorus were used. In the majority of cases with shade tree fertilization, it is advisable to use a complete fertilizer."

This corroborated the conclusion reached by the Missouri Botanical Gardens in their work with shade trees. At the National Shade Tree Conference this summer, Keith K. Kreag stressed the fact that at times more than just the three critical elements might be so deficient in the soil solution that normal processes in the tree are disrupted. The inability of certain trees to secure sufficient iron or manganese from a soil with a high pH (strongly alkaline) was pointed out and the possibility that zinc, copper, magnesium and perhaps others might sometimes be lacking was indicated. So the problem seems to get broader and broader.

Concerning the matter of just where to place the fertilizer in the soil, Chadwick, in his Ohio report, gives some very good data regarding the distribution of the feeder roots in the soil. He found that only 17 to 49 per cent of the fibrous roots were in the upper six inches of soil but that 79 to 98 per cent are in the upper 18 inches. He concluded that "the depth of the holes should correspond to the penetration of the majority of the feeder roots, which, no doubt, will depend on soil type, kind of tree, and perhaps the kind of fertilizer used. As a general statement, a depth of 15 to 18 inches would be ample for the holes."

Chadwick also gives data as to the horizontal distribution of roots which knock one of our old theories of feeding into a cocked hat. It has long been customary to say: "place the fertilizer in

(*Continued on page* 14)

Diagnosing Leaf Disorders

(*Continued from page* 7)

primarily, causing complete killing of the leaves and twigs (Fig. 4C). The so-called anthracnose disease of buttonwood is a good case in point. During a wet spring, this disease can destroy all the young leaves and twigs so quickly that the tree appears to have been injured by a heavy frost.

When the leaves are scorched and spotted following a week or more of extremely dry, hot weather, it is also safe to assume that fungi are not involved but that some serious disturbance in water relations between the leaves and roots has occurred. Such spotting and scorching does not assume the well-defined regular pattern produced by fungus invasion, but is irregular, and usually confined mainly to the leaf edges.

Another criterion which may be used to distinguish between leaf injuries by parasitic and non-parasitic agents is the location of the injury on the tree. For example, fungus leaf spots are usually most prevalent on the lower, more shaded parts of the tree—where moisture is present for the longest period. Injuries resulting from a disturbance of the water relations, as in the case of leaf scorch, are usually present in the more exposed parts of the tree, especially on the side facing the sun and the prevailing winds, or the area above injured or restricted root systems.

Trees affected by virus diseases often exhibit symptoms resembling nutrient deficiencies. The leaves are distorted, and show green and yellow mottling (Fig. 5).

SOOT AND SMOKE INJURIES

Smoke from nearby factories in large cities often contains several ingredients that are toxic to tree leaves. Probably the most harmful fraction in smoke is sulfur dioxide gas, which has been known to injure vegetation in concentrations as low as 2 or 3 parts in a million parts of air.

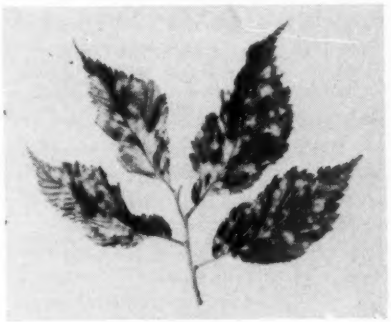


FIG. 5. Mosaic of elm, a virous disease which is often confused with nutrient deficiency symptoms.

Of susceptible trees, those growing closest to the source of the gas are always injured most severely. Brownish-red or yellow areas between the leaf veins of shade trees are a rather characteristic symptom. The margins or tips of some of the leaves may also be discolored. Trees vary considerably in their tolerance for smoky atmospheres. Ailanthus, ginkgo and Carolina poplar seem to withstand such conditions best, and London plane, pin oak, Norway maple, elm, linden and tulip show decreasing tolerance in the order mentioned.

A complete discussion of other leaf troubles, as for example chlorosis that results from a deficiency or non-availability of iron or other elements; leaf scorch of deciduous and evergreen trees, that develops following a disturbance of the water relations in the tree; or leaf-yellowing due to a lack of nutrients, the presence of girdling roots, toxic substances in the air or the soil, and grade fills around trees, cannot be treated here because of lack of space.

Although many leaf troubles appear mysterious and difficult to diagnose at first glance, a little common sense, a keen eye and a desire to learn, will soon enable any commercial arborist to solve many of the problems with which he is daily confronted. As a last resort he can always rely on state experiment station or federal pathologists, who are always willing to lend a helping hand when called.

In submitting leaf specimens to a specialist, the sender should give as much information as possible regarding the particular tree.

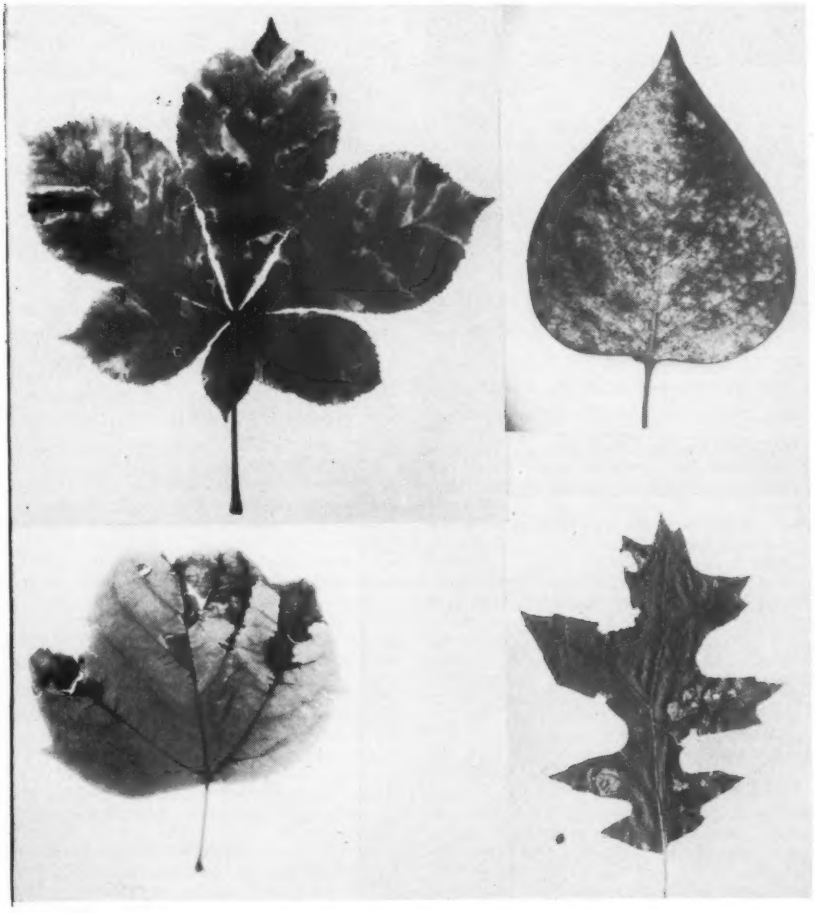


FIG. 4. Some Additional Leaf Troubles Caused by Fungi. (A) Blotch of horsechestnut showing large brown areas surrounded by a yellow margin. (B) Powdery mildew of lilac. (C) Anthracnose of plane showing infection along the veins, a characteristic of most anthracnose diseases. (D) Leaf blister of oak.

Yellow-wood

(*Cladrastis lutea*)

By L. C. CHADWICK
Department of Horticulture, Ohio State University, Columbus, Ohio

Cladrastis lutea, the Yellowwood, is native of the territory from North Carolina west to Kentucky and Tennessee, but can be grown and used as an ornamental tree much outside this territory. As far as its hardiness is concerned, it should be reliable anywhere in the United States. At maturity it forms a tree to 50 feet in height but is more often seen in sizes ranging from 30 to 35 feet, with a broad, rounded head, composed of numerous, rather large spreading branches. These large branches as well as the trunk exhibit a smooth gray bark closely resembling that of the beech in appearance. The wood shows a striking yellow color. The winter buds are naked and are covered by the base of the petiole.

The foliage is attractive, composed of alternate, compound leaves. The 7 to 11 leaflets are ovate or ovate elliptical in shape, about 3 to 4 inches long, glabrous, and bright green in color. The autumn color is a striking yellow.

One of the most interesting characteristics of the Yellowwood is its fragrant, showy, white flowers, produced in pendulous panicles in June. Coming at a time when the flush of spring bloom is passed, these large clusters of flowers, about a foot in length, are especially appreciated. The flowers are followed by a pod about three inches long in early fall.

—*Brownell photo*
Flowers and Foliage of the Yellow-wood

Its cultural requirements are not as exacting as for many other trees. While it will grow in somewhat adverse situations, it prefers a loose, deep, fertile and rather moist soil. While there is little doubt that growth is better under these preferred conditions, I have seen specimens doing very well when planted tight to a paved sidewalk and in poor soil. It seems to tolerate city conditions well and is free from any serious insects or diseases in this section of the country.

One of the main criticisms of Cladrastis lutea that we hear is that it has a tendency to develop weak crotches. This condition is usually brought about by its tendency to form a number of competing leaders when the plants are small but is a condition that can be easily corrected by a little judicious pruning and shaping at that time. Correct cabling will aid in preventing breaking and splitting of limbs on old, poorly branched trees.

The Yellowwood is often included in lists of trees which do not respond to cavity treatment. While I do not prescribe to the practice of the promiscuous filling of cavities, I do know of one tree which has responded to cement filling in small to medium sized cavities.

Propagation may be accomplished by seeds, root cuttings or layering of small plants.

Cladrastis lutea finds its use as an ornamental primarily as a lawn or park tree. Its small size lends to its use on small home grounds. Its low branching habit prevents its use to any extent as a street tree.

Arboretum

(*Continued from page* 5)

ner acting as chairman and one of the departmental editors of *Parks & Recreation.* Its duty, at present, is to acquaint the readers of this magazine with the various botanical gardens and arboretums in North America, their present status and their objectives. Later it will aid materially in the work of the other committees.

III—*Educational Committee*

For the present the Educational Committee consists of C. Stuart Gager, Brooklyn Botanical Garden; C. E. Godshalk, Morton Arboretum, Henry T. Skinner, Morris Arboretum; Henry Teuscher, Montreal Botanical Garden and Donald Wyman, Arnold Arboretum.

This committee is to canvass all members to see what groups of plants they are specializing in, the idea being to eventually have a list of plants, species and varieties which is fairly complete and which will show just where certain things are being grown in this country. The Missouri Botanical Garden has water lilies, Washington Arboretum has rhododendrons, Arnold Arboretum has lilacs, etc., yet it may well be that none of these collections are complete. If a list of all these groups were completely checked over by all member institutions and added to, then made available to all members, we would know much more about the availability of plants in America today.

Other functions will fall to this committee, such as publicizing certain noteworthy plants, finding nursery sources for some, aiding at conventions, aiding with displays, and studying the advisability of making recommendations concerning certain groups of plants—particularly native American plants—from which interesting new horticultural forms might be obtained by hybridization, etc.

IV—*Plant Distribution Committee*

This committee is to work out means by which plants can be grown and distributed to member organizations. It is to keep track of trade regulations. Possibly it is to circulate surplus lists cooperatively made up by member organizations, and possibly to locate nursery sources for rare plants. For the present, this committee should begin work at once to ascertain outside organizations which might aid in the intelligent distribution of rare plant material, to work out some plan whereby member organizations can grow and supply materials for other association members.

V—*Standardization Committee*

This committee is not to be appointed the first year. Later, when much of the information mentioned above becomes available, this committee is to work out a program whereby competent judges can select a few of the better horticultural varieties in a large group, such as the lilacs for instance. Such recommendations would only be made after careful study of several collections in different parts of the country. There is not a sufficient differentiation in certain of these groups to warrant so many horticultural varieties being grown. This committee would be charged with the important task of selecting the best and the Publication and Educational Committees would publicize such selections. The committee would also be charged with the standardization of nomenclature and the working out of some system whereby new horticultural varieties could be compared with older ones accurately for commercial organizations.

VI—*Maintenance Committee*

This committee is to be on continual watch for new types of maintenance equipment which would reduce maintenance costs, and for new methods of labeling; it is to make recommendations for special methods of propagation, insect and disease control, etc.

Discussions On Fastigiate Tree Varieties

by
MALCOLM A. MILNE, *City Forester*
and
JACOB GERLING, *Ass't Supt. of Parks, Rochester, N. Y.*

Part II.

The cover picture of this issue of TREES shows Westfield Street in Rochester, N. Y., which was planted twenty-five years ago to this upright variety of Sugar Maple. The picture tells the story of the tremendous value that this type of tree has for street use. Note in particular the small trunk and the neat, quiet dignity given to the street by this tree. The species, if it had been used here, would have thrown this narrow street with a comparatively short setback of the houses, out of proportion. There would probably not have been any nice lawns, or well cared for foundation plantings in front of the homes because of excessive shade.

UPRIGHT GINKGO or MAIDENHAIR TREE
(*Ginkgo biloba fastigiata*)

The Ginkgo or Maidenhair Tree is a relic of geologic times, being the only remaining species of the order Ginkgoales. This tree was introduced to America from Asia early in the nineteenth century, and has been widely used as a specimen tree and more recently for street embellishment.

"Although once possessing a number of species, this order is now represented by only a single form, Ginkgo biloba, the ginkgo or maidenhair tree of China and Japan. The species has been cultivated for centuries in the temple gardens of these two countries and possibly owes its survival to this custom. It is now a common ornamental in this country and in the northeast is hardy as far north as Southern Maine.

"The leaves are fan-shaped, with or without a notch at the apex, and show dichotomous venation. On young twigs they are borne in spirals but on the older growth persist only upon short spur shoots.

"The flowers are dioecious. The fruit resembles a plum in shape and size, and possesses a fleshy outer layer which upon ripening is exceedingly malodorous due to the formation of butyric acid or its derivatives (odor of rancid butter.")[1]

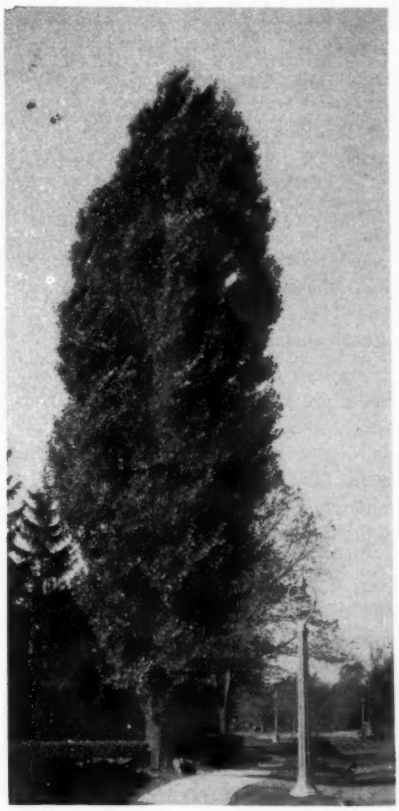
—*Photo courtesy Hollis Howe, Baltimore, Md.*
A mature specimen of *Ginkgo biloba fastigiata* standing in Carroll Park, former home of Charles Carroll of Carrollton, a signer of the Declaration of Independence.

The Ginkgo reaches a height of 80 feet on better sites. It is very irregular in outline and its ultimate shape may vary from a more or less upright form to a broad, rounded outline. Because of this wide variation in crown shape its use as a street tree, where symmetry and uniformity are desired, has been retarded, in spite of its many desirable features. However, there exists an upright form which may be depended upon to retain its shape with but little attention.

Ginkgo biloba fastigiata is a variety with a definite, almost columnar shape. The branches are strictly fastigiate, closely hugging the trunk, and divide and subdivide to form a very compact crown.

This tree prefers a moist, well drained, sandy-loam soil, but does well on poorer sites.

Propagation is by budding or grafting onto seedlings of the parent species. Bud wood or scions should be taken from staminate trees only, as the rancid odor of the ripe fruit of pistillate trees is a very undesirable feature. Undoubtedly this species would be far more popular today were it not for the bad reputation obtained by indiscriminate planting of pistillate trees.



—*Photo courtesy Park Dept., Rochester, N. Y.*
The familiar Lombardy Poplar. Beautiful, but victim of too many bad habits, diseases and insects.

Maintenance cost is very low. The trees have a tendency to grow some horizontal branches, particularly at the lower portion of the crown. These should

(*Continued on page* 17)

(1) Harlow, W. M: "The Dendrology of the More Important Trees of the United States," part II, p. 1. 1930.

Living In a Manhole

(*Continued from page* 10)

holes made in a zig-zag circle beneath the edge of the crown of the tree." But according to Chadwick all roots 2 millimeters and less in diameter (feeder roots are very fine) were present within a radius of 8 feet for all trees (8 year old elms) studied. Ninety per cent or better of these root counts were within a 4 foot radius. The following rule is given: "According to the results of this study, the location of the holes should start within a short distance of the trunk and extend beyond the spread of the branches for many trees. The radius of this area *in feet* for small trees would be approximately one and one-half or two times the diameter of the trunk *in inches.* With larger trees having a normal branch spread, it is probable that the holes should be distributed over the area beneath the branches and extending beyond the spread of the branches a distance equal to a third or a half the branch spread."

Another theory on tree feeding which has a profound bearing on the response which may be expected and which has undergone pretty thorough overhauling in the last few years has to do with the quantity of plant food needed by trees and the probability of producing injury by over-feeding. A few years ago we were hesitant to recommend as much as one pound of a low nitrogen fertilizer per inch of circumference of the tree. But as a result of the work done at the Missouri Botanical Gardens as well as elsewhere we now consider this quantity of *high* nitrogen fertilizer to be the minimum that may be expected to produce measurable results and this only with small trees. Large trees require from one and one-half to twice this quantity per inch of diameter of trunk. It has been demonstrated that trees will make use of very large amounts of fertilizer, and that light feedings are really not worth the effort and expense involved in the application.

At least we can feed trees today with little fear of producing injury and all shade trees would probably be better off if we followed the formula worked out at the Missouri Botanical Gardens in determining the amounts required, especially where undernourishment is marked. By this formula one pound of plant food is allowed for each foot of height of the tree plus one pound for each foot of branch spread plus one pound for each inch of circumference of the trunk. On this basis a tree 80 feet high, having a branch spread of 60 feet and a trunk circumference of 125 inches would require 265 pounds of a high nitrogen fertilizer. This would be equal to more than 6 pounds per inch of diameter or 2 pounds per inch of circumference. It is probable that such a tree could actually utilize more food than this, especially if there was sufficient area around it to permit proper application, because it *is* a very large tree on any one's hacienda.

One of the most important results to come out of the research on tree feeding of the last few years is the evidence that trees need not necessarily be fed in the spring. A number of years ago, H. L. Jacobs of the Davey Tree Expert Company, showed that trees fed in the fall appeared to do as well as those fed in the spring. But there were still those who maintained that trees fed in the fall would be made susceptible to winter injury and probably death. August and even July were given as the final dates for feeding. Then the work at the Missouri Botanical Gardens again established the fact that trees could be fed at any time in the year although it was still held that "early spring is the most satisfactory time to feed trees." But an important statement was made relative to the theory that fall feeding predisposed trees to winter injury which follows: "There seems to be little danger from fall applications producing succulent growth too late to ripen before frost. Fertilizers control the rate of growth as well as the total growth, but have *no* influence upon the *periodicity of growth.*" This should be copied in the little blue book of every one having anything to do with tree feeding.

In work reported by C. F. Williams in North Carolina Bulletin No. 321 in 1939, the theory that spring was the most favorable season for tree feeding was further weakened. It was concluded that the fall was at least equally as satisfactory for feeding as the spring. Again in North Carolina Bulletin No. 322 it was stated that ". . . fertilization affected the rate of terminal growth but *not* the time during which growth occured, which was more dependent upon external growth conditions such as weather."

(*Continued on next page*)

Clipped Trees

By Hollis J. Howe
City Forester, Baltimore, Md.

Due to an early disregard for the need of conserving space, the "New World" has, perhaps, not until recent times, appreciated the desirability of clipped trees for certain situations. By the use of the term "clipped trees," reference is not made to the old and rather general practice of topiary gardening with evergreens on our finer estates and cemeteries, but rather to the treatment of deciduous trees. That this form of pruning may be desirable under certain conditions it is intended here to substantiate.

—Photo courtesy Baltimore Park Dept.
Clipped Lindens (*T. cordata*) near City Hall

The more or less universal antipathy toward "de-horning" on the part of ethical arborists, particularly where trees growing in the open are involved, is indeed justified. Such efforts to improve upon nature, while perhaps not exactly comparable to "painting the lily," are at least as far-fetched as the white-washing of tree-trunks or other attempts at embellishment. Corrective pruning to relieve ungainly tops or weakened crotches is always in order. Unfortunately, however, the practice of topping to clear over-head wires and, in some instances to permit the use of trees where faulty design would render their use otherwise impossible, has too often been responsible for misguided effort on the part of tree owners that has not only been detrimental to the trees themselves but has caused much needless expense.

The owner of one or a few trees is usually the offender against nature, due, invariably, to the bad examples that have

(*Continued on page* 16)

THRU *the* MICROSCOPE

By Dr. C. J. Humphrey

ARMILLARIA MELLEA: Some interesting greenhouse tests in temperature-controlled tanks are reported by Bliss (1) from Riverside, California. These were made on citrus, peach, apricot and geranium. The most severe infection on orange was at 50 deg. F., with moderate infection at 63 deg., and slight infection at 75 deg. With the other three hosts the most severe infection occurred at 63 deg. to 75 deg. Infection did not take place at 88 deg. and all roots were healthy, but at 100 deg. the roots died also. The optimum temperatures for *Armillaria* on glucose-potato agar lie between 68 deg. and 75 deg. F., and mean weekly soil temperatures in a citrus orchard at Anaheim, southern California, ranged in 1939 from 49 deg. to 85 deg. at 6 inches and from 56 deg. to 68 deg. at eight feet.

La Rue (2) reports that this root rot is spreading insidiously in citrus groves of San Bernardino county, California, and asserts that apparently more than one treatment with carbon bisulphide is necessary.

DUTCH ELM DISEASE: Felt (3) discusses the present and future situation regarding this disease and its control and presents data on insects and wind drift as important agencies in its spread.

Random samples of elm wood infested by the insect, *Scolytus multistriatus*, recognized carrier of the disease, were collected by Rankin, Parker and Collins (4) over an area of about 3000 square miles of old infected territory in New York. Of the 154 infested samples found only 38 per cent of the beetles emerging therefrom were found to carry the disease. The results therefore indicate either a low efficiency for the beetle as an inoculating agent, or a critical balance requisite for infection that is rarely satisfied.

Collins, Parker and Dietrich (5) report that in field collections in southeastern New York the percentage of infective beetles varies widely from year to year, ranging from less than 1 per cent at Yonkers, N. Y., in 1939, to 15 per cent in the Bronx in 1935. When cultured directly after emerging from diseased wood they usually averaged considerably less than 50 per cent. Uninfected elm wood also produced as high as 16 per cent of positive beetles when stored out-of-doors. This led to the conclusion that dead or dying elm wood of whatever origin is a potential source of inoculum from which the disease may be spread. Since the beetles can carry the fungus into uninfected wood, and their progeny can carry it out, such wood serves as a reservoir for further spread.

Moses and Hoffman (6) stored artificially infected beetles for periods of 30 to 120 days at different temperatures to determine whether the fungus, *Ceratostomella ulmi*, would survive. When cultured immediately 100 per cent were positive; after 30 to 60 days nearly all; at the end of 90 days only 60 per cent at 70 deg. and 58 per cent at 60 deg. F., but at the end of 120 days this dropped to 0 and 22 per cent respectively, although all beetles stored at the lower temperatures for 90 to 120 days were positive. When stored for 1 to 2½ years nearly all were positive at 10 deg. F., and the latter temperature is recommended.

True and Slowata (7) stored sections of diseased elm branches under shade and in the open, some of them peeled, in an attempt to determine the longevity of the fungus. After 20 months' storage the fungus was recoverable from only a small percentage of all sticks, except those stored in the woods with the bark on and the diseased side oriented downward, where 23 per cent were positive. With peeled sticks the percentages were consistently lower than for unpeeled.

In order to determine the reliability of a trunk-sampling method of detecting the disease in suspected trees Ahrens (8) removed with a ½ inch leather punch core samples extending into the trunk for 2 to 5 annual rings. These were taken at 3 to 6 inch intervals on the circumference at about shoulder height, examined for fungus discoloration, and the discolored samples cultured. During the dormant season 1936-37, 6031 elms considered disease-free when last inspected for foliar symptoms in the preceding summer were tested and 45 new infections were discovered, raising the total percentage about one-third. During the growing season 80 to 92 per cent of the diseased trees could be detected by the method about two weeks after foliar symptoms were noted. The method is of value in supplementing summer scouting; in appraising the effectiveness of summer scouting; and in supplanting summer scouting in wild or semi-wild areas adjacent to concentrations of valuable elms.

Artificially-infected elm trees, when not completely killed, often fail to express external symptoms the season following inoculation. Smucker (9) investigated this apparent recovery by setting aside 115 trees about ¾ inch in diameter which had pronounced external symptoms shortly after inoculation in 1936. In 1937 only three showed external symptoms, but all showed the internal presence of the fungus. Failure to show external symptoms was not considered attributable either to lack of pathogenicity or to immunity acquired by the infected trees.

As a matter of general interest those desiring a popular review of the disease may profitably consult Cornell University extension bulletin 437 entitled "Dutch Elm Disease and its Control," May, 1940.

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(1) Phytopathology 31, No. 1, p. 19. 1941; (2) Citrus Leaves 20, No. 3, p. 5. 1940; (3) Sci. Tree Topics 1, No. 3, p. 18. 1940; (4) Phytopath. 31, No. 1, p. 19. 1941; (5) Cornell Agr. Exp. Sta. Bull. 740. 1940; (6) Phytopath. Vol. 30, No. 8, p. 701. 1940; (7) Phytopath. 30, No. 3, p. 272. 1940; (8) Phytopath. 30, No. 6, p. 521. 1940; (9) Phytopath. 30, No. 12, p. 1052. 1940.

Living In a Manhole

(*Continued from preceding page*)

Finally in 1940 we find Prof. Chadwick making the statement all this work has been leading up to. On page 92 of Ohio Bi-monthly Bulletin No. 204, quoted from previously, he writes as follows: "The best time for fertilizer application depends upon two factors: favorable temperature and ample moisture. Although the spring has been the general period of applying fertilizers recent experimental work indicates that, with shade trees at least, fall is just as favorable or perhaps more favorable." Thus we now learn that we may feed trees at any time during the year with equally good results and without the slightest fear that any damage may result because the season is not correct. This can mean much to the park superintendent and the commercial tree expert.

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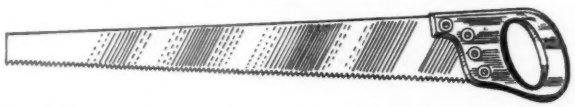

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THE FANNO SAW WORKS Chico, California

Clipped Trees

(*Continued from page* 14)

been set for him. A case in point is represented by the owner of a pear tree who, upon inquiry as to why it did not bear, explained that the tree had been trimmed in the general shape of a giant mushroom. Had it not been such a serious matter to the owner, he might have displayed his usual keen sense of humor when told that a pear tree should be pruned pear-shaped and not plum-shaped.

There are certain conditions, however, under which the clipping of deciduous trees is not only desirable but necessary, if trees are to be grown at all. Many of the famous squares in the old world with their heroic distances, magnificent vistas and splendid architecture call for plantings of such formality as to preclude the use of trees in their natural form. Usually the trees in such a scheme are so arranged as to make them impossible of replacement in the case of failures if they were not so clipped as to permit the moving in of smaller trees that will meet the requirement of uniform tops as set by the older survivors.

There are also short-sighted methods of street design—or lack of it entirely—that leave inadequate distance between the curb and building facades, and between the structures themselves, which require that trees either be clipped or dispensed with altogether. The admission of adequate light and air to the housefronts is absolutely essential to health, much less the upkeep of property, in the congested type of development common to our eastern cities both in North and South America, as well as the Old World.

Practitioners in those cities where space is ample, will be found to be in disagreement with advocates of such "weed trees" as Poplars, Paradise, Paper-mulberry and Silver-maples. Yet these trees all lend themselves readily to intelligent clipping and, if given a periodical setback in this way, will not even be recognized by the layman as being of "that make of tree that raises the sidewalks, clogs the sewers and breaks up with every wind-storm." They will, on the contrary, be found to have that all-redeeming feature of being able to grow. This may be a slow process, but it must be remembered that we require a tree of limited proportions. There are many examples of trees that have been so treated that are apparently but little larger today than they were 20 years ago, in the personal knowledge of those in charge of them.

There are many varieties of trees which are amenable to such treatment. Perhaps the finer branched sorts are best. Some of these, in addition to those already mentioned, are Planes, Lindens, Hawthorns and such smaller trees as Sophora and even Standard Privet. Among the coarser-branched trees in addition to Paradise, even the Horsechestnut has been clipped for years in European cities. It is probable that many others would be found to be friendly to such grooming. It is certain that there are many sub-tropical kinds that would submit.

Diagnosis Outline

(*Continued from page* 8)

B. Twigs.
1. Observe annual growth in length.
2. Appearance in cross section; streaking or other discoloration.
3. Is there dropping or shedding of twigs?
4. Are there scale insects, twig girdlers? Specimens.
5. Note size and shape of buds.

C. Larger branches.
1. Note amount of dead wood present.
2. Look for evidence of extensive pruning, estimate approximate age of wounds and note how they were treated.
3. Appearance of living branch in cross section, especially number of rings of growth per radial inch or fraction. (Judicious use of an increment borer may be justified.)
4. Insect damage, borers, bark beetles, etc. Collect specimens.
5. Evidence of sap wood rots, soft wood, bark coming off and especially sporophores of fungi. Collect specimens if possible.
6. Note presence of wire or chain braces or tie rods.
7. Cankers or other lesions of uncertain etiology.

D. Trunk.
1. Search for cankers or dead areas with loose bark. Tap bark with knife handle.
2. Cavities. Describe—location.
   (a) Opening size.
   (b) Depth and condition of interior.
   (c) Condition of margin, callus, living bark or dead wood.
   (d) Previous treatment, if any. (See under VII-B).
3. Structural weaknesses, split crotches, interfering limbs, etc.
4. Borer holes or other evidence of insect work.
5. Sporophores or other evidence of fungi.
6. Color of cells at bottom of bark fissures.
7. Pruning or other wounds, their size, location and condition.
8. "Churn-butt" or enlargement near the ground.
9. Frost cracks.
10. Slime flux—origin, apparent age, active?
11. Evidence of lightning or electrical burning from wires.

E. Roots.
1. Look for evidence of self girdling. While most common just below soil level, these girdling roots may sometimes be seen without excavating.
2. Condition and appearance of feeding rootlets. (Excavate if practicable). Note particularly color of bruised rootlets, whether brown, blue or white
3. Cankers at root crown.
4. Mechanical injuries.
5. Decay of larger elements, basal cavities, etc.
6. Exposure, by washing away or otherwise removing soil. How extensive, and when?
7. Presence of fungi or insects should be noted.

IV. Natural Environment.
A. Exposure, direction.
B. Slope, grade and extent.
C. Direction of prevailing winds.
D. Nearby bodies of water, salt, fresh, lake, ponds, river, pool.

V. Artificial Environment.
A. Change of soil level by filling or grading.
1. Special treatment around trunk, if any.
B. Change of water-table level by flooding or drainage.
C. Shading by buildings or other objects for a whole or part of the day.
D. Pavement. How near? Of what materials and for how long established.
E. Service pipes. Gas, steam, water or sewer pipes. How near? Investigate possibility of leaks.
F. Electric wires near or touching any part of tree. Kind of current.
G. Guy wires or other supports attached to tree. Method of attachment and apparent effects should be noted.
H. Soil cover under tree. Grass turf, cultivated soil, uncut grass or weeds, mulch.

VI. Soil (Use of soil auger is helpful).
A. Depth—to sand, rock or hardpan.
B. Natural or built. (The latter type often occurs in cities and gives rise to serious problems).
C. Texture, loose, friable, heavy, compacted.
D. Proportion of humus, if any.
E. Degree of acid or alkaline reaction.
F. Qualitative tests for Nitrogen, Phosphorus and Potash may give significant clues.

VII. History.
A. Drouth, early or late frosts or severe winters, have these been recent or frequent?
B. Treatment or care by professional tree experts or others:
1. Spraying or dusting for control of disease or insects. When and with what materials?
2. Cavity treatment, materials and method used, when was work done? Apparent results.
3. Wound dressings used. What material? Evidence of injury and durability.
4. Fertilizers—when, how and with what materials?
5. Have any substances other than commercial fertilizers ever been introduced into the soil or injected into the trunk to "cure" the tree?
C. Has the tree ever been transplanted? How long ago and by whom?

(*Continued on next page*)

Fastigiate Trees

(*Continued from page* 13)

be removed while young. The Ginkgo is remarkably free from insect pests and diseases.

Upright Ginkgo, while retaining the advantages of hardiness, freedom from insects and diseases, rapid growth and golden autumnal leaf coloration of the parent species, has the added advantage of symmetric crown shape. It is ideally suited to planting on narrow streets or streets having narrow parkways, for small-area planting and formal locations. Easily grown and transplanted, this variety should be welcomed by city foresters and horticulturists alike.

UPRIGHT SUGAR MAPLE

(*Acer saccharum columnare*)

The fastigiate form of Sugar Maple (*Acer saccharum columnare*) is one of the finest of the upright forms of trees for planting on narrow streets and small lawns. This tree retains the fine attributes of hardiness, toughness and leaf coloration of the parent species, with the additional benefit, where needed, of upright growth.

This tree may be planted on streets too narrow to accommodate the parent species, or on streets where the houses are close to the sidewalks. It is one of the few upright varieties from which the lower branches may be trimmed without detracting from the appearance of the trees. In fact, the appearance is enhanced by such trimming. For this reason, the tree may be planted in a parking space of *two and one-half to three feet in width.*

This upright variety does best in moist, well-drained, loam soil. It is more particular than the Upright Norway Maple as to soil requirements. It is slow growing, although the terminal shoots, or leaders, may grow from 12 to 15 inches in better years. Feeding every five or six years with a complete fertilizer has doubled the growth in some cases. It has a compact, fibrous root system and transplants easily. It is very hardy and may be used where severe winters are common.

Like the species, this tree is susceptible to verticillium wilt. The sugar maple borer may infest the trunks of larger trees if they are not kept in vigorous condition, although the variety seems to be much less susceptible to attack by the borer than the species.

The leaves on terminal shoots are scarce and small. This is not an indication of disease, but a natural habit, the strength going into wood development rather than leaf development. Leaf growth is generally normal on second-year wood.

Upright Sugar Maple has been on the market for a number of years. However, it is not common and may be difficult to obtain. Propagation is by budding onto seedlings of the species. This tree deserves a more widespread use.

There is another upright sugar maple called the Sentry Maple (*Acer saccharum monumentale.*) This is a spire-like tree differing from *A. s. columnare* in that the short, very slow-growing lateral branches are nearly perpendicular to the trunk, rather than sweeping sharply upward towards a vertical position. ("Trees" magazine, Oct., 1940, p. 5).

All botanists do not recognize *A. s. monumentale* as a distinct variety, classing it as a freak. For this reason the scientific names *Acer saccharum columnare* and *Acer saccharum monumentale* are both used to indicate what we choose to call *A. s. columnare.*

(*to be continued*)

Diagnosis Outline

(*Continued from preceding page*)

D. Has there been a recent change in the environment from forest to open conditions?

E. Has there been systematic watering? Details.

VIII. General questions.

A. Are there other plants of the same kind nearby? Are these or others similarly affected?

B. Has the trouble appeared in previous years? If so, for how long?

NOTE: *Photographs* and *specimens* often aid materially in diagnosis. *Sketches* and *drawings* may be employed to advantage, particularly in problems involving unfavorable environment.

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Authors and Books

The following books may be ordered from TREES Magazine, Box 886, Santa Monica, California.

MAINTENANCE OF SHADE AND ORNAMENTAL TREES, by P. P. Pirone. Oxford University Press, New York City. 395 pp., 172 illus. $4.50.

A privileged preview of the final galley proofs of this book sent by Dr. Pirone afforded a most happy and fruitful weekend of reading.

It is a distinct pleasure to at last have the intricacies of scientific tree care elaborated and expanded, and to bring out the true ramifications of a complicated science. This book definitely banishes the "saw and ladder" era to a dark niche in the past.

A recapitulation of the chapters is contained on the inside front cover of this issue; a glance will suffice to show the important features covered.

To this writer the chapters on "The Soil and Its Relation to Trees," "Fertilizers and Their Use," "Diagnosing Tree Troubles" and "Non-Parasitic Injuries" are easily the highlights of the book. They go into detail of the large field involved and a careful study of these chapters will amply reward the reader.

Approximately 200 pages are devoted to "Diseases and Insect Pests" of the principal ornamental trees and shrubs. A distinct feature of these discussions is the completeness of the control factor; it is one thing to know what causes a disorder, but control is something else. Dr. Pirone undertook a huge research job to be so complete.

The chapter on cavity treatment is very capably handled. It neither builds up nor detracts from this phase of tree care, but very honestly discusses it on the basis of scientific diagnosis. We feel that an elaboration of some of the materials in popular use for cavity filling could have been made, but the intelligent discussion of technique more than offsets this questionable omission.

We feel that, without reservation, this book is the first real contribution to the science in its modern aspects and sincerely hope that from it will spring volumes on specific phases so that Tree Preservation can build its own library.

* * *

SELECTION OF NARROW-LEAVED CONIFEROUS EVERGREENS, by L. C. Chadwick. American Nurseryman, 508 So. Dearborn St., Chicago, Ill. 64 pp. 40 cents.

This latest compilation of Dr. Chadwick's papers that have been running in the American Nurseryman is a valued companion to his "Compiling a New Nursery List." The book covers a general description of the following subjects: Vines, Ground Covers, Low or Dwarf Shrubs, Small Shrubs, Medium-size Shrubs, Large Shrubs, Trees. There follows then thirteen pages devoted to the "Uses of Narrow-Leaved Evergreens." This splendid up-to-date catalog of the newest and best plants should be indispensible to anyone working with plants.

COMMERCIAL TIMBERS OF THE UNITED STATES, by H. P. Brown and A. J. Panshin. McGraw-Hill Book Company, New York City. 554 pp. Illus. $5.00.

For years the author's book "Identification of the Commercial Timbers of the United States" has been the accepted reference on this subject. However, in this new volume considerable new data is added; keys completely revised and many new illustrations give value to the text.

* * *

NUT GROWERS' HANDBOOK, by Carroll D. Bush. Orange Judd Publishing Co., 15 E. 26th St., New York City. 190 pp., illus. $1.75.

A most interesting book containing information that the Nurseryman, Arborist or Landscape Architect can use to good advantage when asked to advise on the culture of nut trees. The subject is treated strictly on its American application. The text is written with an interesting story flavor.

* * *

ALIEN PLANTS GROWING WITHOUT CULTIVATION IN CALIFORNIA, by W. W. Robbins. University of California, Agricultural Experiment Station, Berkeley, Calif. 127 pp.

* * *

DISEASES OF FLOWERS AND OTHER ORNAMENTALS, by Ralph E. Smith. University of California, Berkeley, Calif. Circular No. 118. 108 pp.

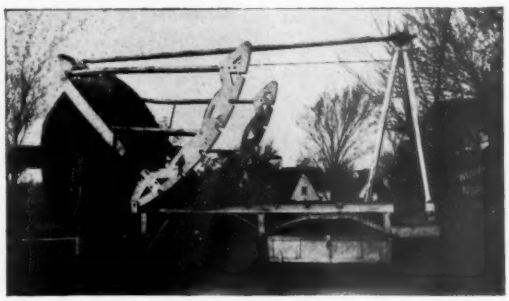
* * *

HOME FLORICULTURE IN CALIFORNIA, by H. M. Butterfield. University of California, Berkeley, Calif. Circular No. 53. 190 pp.

* * *

TREE FRUIT VARIETIES FOR KENTUCKY, by C. S. Waltman. Kentucky Agriculture Experiment Station, University of Kentucky, Lexington, Ky. Bulletin No. 394. 44 pp.

■ ROGER SOHNER and the MRS., of SAN ANSELMO, on a vacation jaunt in Sou. Cal. dropped into the Pasadena Flower Show where we met with TED HOLDERNESS, PASADENA CITY FORESTER. Roger is going to present the CERTIFIED ARBORIST BILL of the WESTERN SHADE TREE CONFERENCE to the current session of the Legislature. As soon as we get the bill number, will inform you so YOU CAN WRITE YOUR ASSEMBLYMEN AND SENATORS TO VOTE FOR IT.



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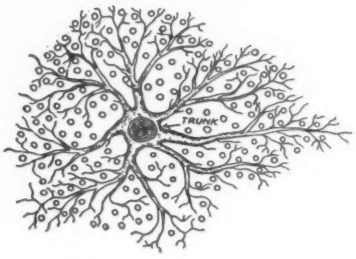

Diagram of root system

(1) *Diagram showing method of supplying Gaviota* TRE-TONIC *to Chlorotic trees. This method is advocated by leading Arboricultural authorities. Average dosage is computed at 5 lbs. of Gaviota* TRE-TONIC *to each inch of trunk diameter for trees over 6 in. For trees under 6 in. cut dosage 50%. Punch holes with bar or augur at the points indicated in the diagram by small circles.*

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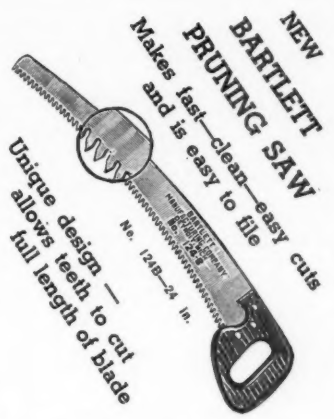

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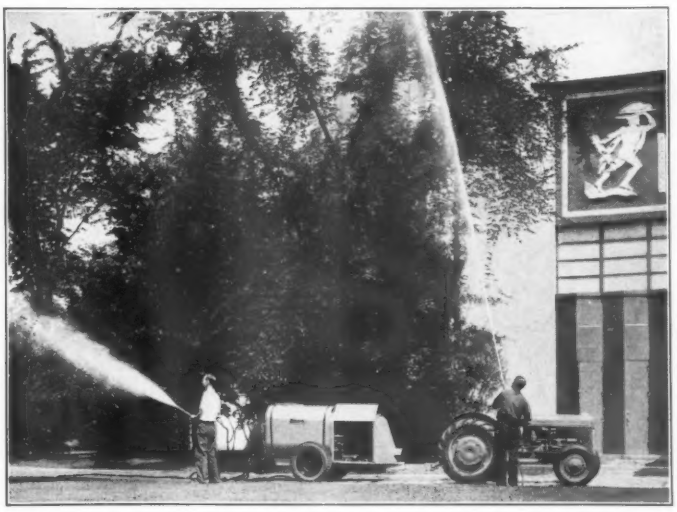

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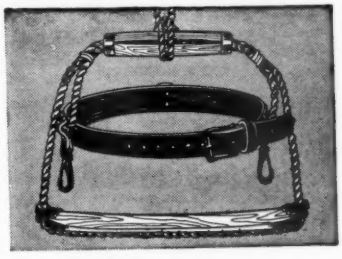

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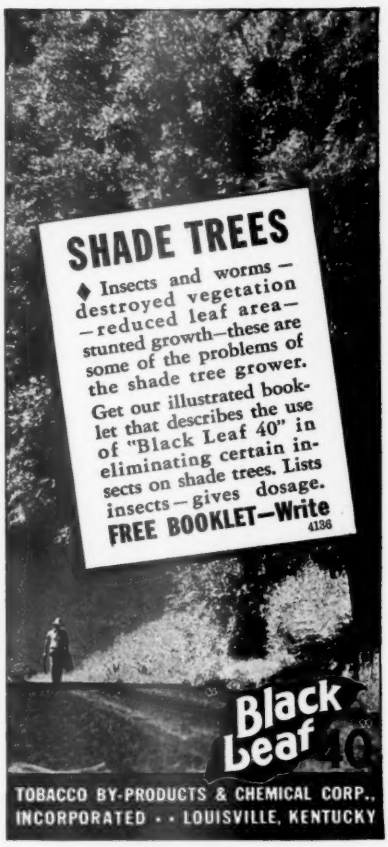
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